

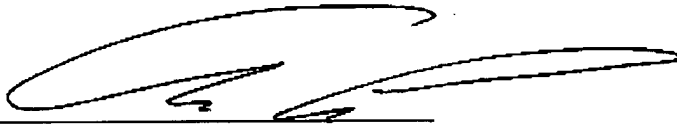
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TO:	Mail Stop AMENDMENT Mr. Burton Mullins, Art Unit 2834	FROM:	ADAM J. CERMAK
FAX:	703.872.9306	REF. NO:	003-084
VOICE:	571.272.2029	PAGES	10 (incl. this sheet)
App. No.:	10/667,327	DATE:	9 May 2005

The undersigned hereby certifies that the following document(s) is (are) being transmitted by telefacsimile to the United States Patent and Trademark Office at the above "FAX" number, on the above DATE:

- 1) This Facsimile Certification (1 pg)
- 2) Transmittal Letter (1 pg)
- 3) Petition for Extension of Time (1 pg)
- 4) PTO-2038 (1 pg)
- 5) Response under 37 C.F.R. § 1.111 (6 pp)


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Registration Number 40,391

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9 May 2005

In re application of: Denis THIOT
 Application. No.: 10/667,327
 Filing Date: 23 September 2003
 Title: Gas-Cooled Generator

Atty. Ref. No. 003-084

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Mail Stop Amendment
 Commissioner for Patents
 P.O. Box 1450
 Alexandria, Virginia 22313-1450

☒ Via Facsimile to: 703.872.9306

Sir:

Transmitted herewith is a(n) Response in the above-identified application.

- ☐ Small entity status of this application under 37 C.F.R. §§ 1.9 and 1.27 has been established by a verified statement previously submitted or a claim previously made.
☐ Small entity status under 37 C.F.R. §§ 1.9 and 1.27 is claimed.
☒ No additional fee is required, as calculated below.
☐ A fee is required, as calculated below:

	(Col. 1)		(Col. 2)	(Col. 3)
	<i>Claims Remaining After Amendment</i>		<i>Highest No. Previously Paid For</i>	<i>Extra</i>
Total	12	minus	20	0
Indep.	1	minus	3	0
<input type="checkbox"/> First Presentation of Multiple Dependent Claims				

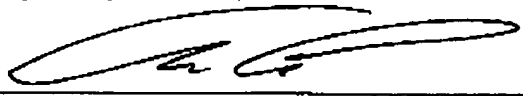
SMALL ENTITY			LARGE ENTITY	
<i>Rate</i>	<i>Fee</i>	or	<i>Rate</i>	<i>Fee</i>
x \$25 =	\$	or	x \$50 =	\$0.00
x \$100 =	\$	or	x \$200 =	\$0.00
+ \$180 =	\$	or	+ \$360 =	\$
Total	\$	or	Total	\$0.00

- ☐ Please charge Deposit Account No. 50-2821 in the amount of \$ _____.
☐ A check in the amount of \$ _____ is enclosed, including to cover any extension of time fee.
☐ Please charge the credit account, identified in the attached Credit Card Payment Form (PTO-2038), \$ _____.
☒ The U.S. Patent and Trademark Office is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to
☐ Deposit Account No. 50-2821
☒ the credit account identified in the attached PTO-2038.
☒ Any filing fees under 37 C.F.R. § 1.16 for the presentation of extra claims.
☒ Any patent application processing fees under 37 C.F.R. § 1.17.

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Respectfully submitted,


 Adam J. Cermak
 Reg. No. 40391

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Denis THIOT

Application No.: 10/667,327

Filing Date: 23 September 2003

For: GAS-COOLED GENERATOR

Art Unit: 2834

Examiner: MULLINS, Burton S.

Attorney Ref. No.: 003-084

Via Fax: 703.872.9306

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MAY 09 2005

RESPONSE UNDER 37 C.F.R. § 1.111

Mail Stop AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated 9 November 2004, which set a 3-month shortened statutory period of response thereto, please amend the above-captioned patent application as follows. A Petition for a 3-month extension of time under 37 C.F.R. § 1.136(a), and the fee specified in 37 C.F.R. § 1.17(a), is filed concurrently herewith.

Favorable reconsideration, reexamination, and allowance of the present patent application are respectfully requested in view of the following remarks.

Allowable Subject Matter

Applicant gratefully acknowledges the indication, at pages 1 and 7 of the Office Action, that the subject matter of Claim 10 is free of the prior art.

Rejection under 35 U.S.C. § 103(a)

In the Office Action, beginning at page 2, Claims 1-3, 5, 8, and 9 were rejected under 35 U.S.C. § 103(a), as reciting subject matters that allegedly are obvious, and therefore allegedly unpatentable, over the disclosure of GB Patent No. 724,875 ("GB '875"), in view of the disclosure of U.S. Patent No. 3,969,643, issued to Säpper. Claims 1-5, 8, 9 were rejected under section 103(a) over the disclosure of GB Patent No. 1,170,754, invented by Davidson, in view of

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Säpper. Claims 6 and 7 were rejected under section 103(a) over the disclosures of *GB'875* or *Davidson*, in view of *Säpper*, and further in view of U.S. Patent No. 3,816,751, issued to Jampen. Claim 11 was rejected under section 103(a) over the disclosures of *GB'875* or *Davidson*, in view of *Säpper*, and further in view of U.S. Patent No. 3,702,964, granted to Kudlacik et al ("Kudlacik"). Claim 12 was lastly rejected under section 103(a) over the disclosures of *GB'875* or *Davidson*, in view of *Säpper*, and further in view of U.S. Patent No. 4,049,972, issued to Crowdy et al. ("Crowdy"). Applicant respectfully requests reconsideration of these rejections.

The present application describes a gas-cooled generator. According to an exemplary embodiment, a generator uses a compact auto-ventilated brushless rotating exciter. Because of the high heat capacity of pressurized Helium, the generator can be used with simple ventilation into the main stream of the generator cooling flow. The brushless exciter also permits limiting the number of penetrations through the high-pressure vessel and to avoid pollution problems that would occur in case slip rings and brushes would be used.

Claim 1 relates to a generator having a combination of elements, including a rotor and stator with a gap between the rotor and the stator, the gap having ends, baffles at the ends of the gap, a substantially hermetically sealed enclosure filled with a gaseous coolant at superatmospheric pressure and including a coolant receiving region, the rotor and the stator positioned in the enclosure, the stator including a core, cooling ducts in the stator core, and windings which form a winding overhang at each end of the stator, the rotor including cooling channels, wherein, when the generator is operating, and when the generator is in fluid communication with a cooling apparatus, gaseous coolant flows in a circuit from the cooling apparatus past the winding overhangs, then through cooling channels in the rotor, then into said gap, then through the cooling ducts in the stator core into the coolant receiving region, and then through the cooling apparatus, the baffles both inhibiting escape of the gaseous coolant from the ends of said gap and inhibiting entry of the gaseous coolant into the gap through its ends, the flow of gaseous coolant around said cooling circuit being caused solely by the centrifugal force acting on the gaseous coolant in the cooling channels of the rotor.

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The prior art, including *GB '875, Säpper, Davidson, Jampen, Kudlacik, and Crowdy*, fails to disclose, describe, or suggest combinations of elements as recited in the pending claims.

GB '875 describes a dynamo-electric machine including many more differences than stated in the Office Action. *GB '875* essentially describes a rotor cooling method for a large Hydrogen-cooled turbine generator. Although there is no clear description in *GB '875* of the stator windings ventilation, one skilled in the art, upon a full and fair reading thereof, would easily recognize from Fig. 3 at least that the coolant doesn't flow past the winding overhangs 30, and instead is pulled through openings in the unlabeled endplate, well spaced from the overhangs. Moreover, the general ventilation is clearly driven in part by an additional axial fan 31; see page 3, lines 17 *et seq.*

Säpper describes a dynamo-electric machine that is quite different, as *Säpper* does not describe the coolant as being under pressure, and because Figs. 1 and 3 clearly illustrate that the cooling gas flow (arrow 20) comes from outside the machine's housing into the inlet space 4. Thus, what *Säpper* describes is plainly an open ventilation machine, and *Säpper's* housing is not a substantially hermetically sealed enclosure. On such open ventilation machines, the absence of a separate and elaborate fan, despite the use of external air as the cooling fluid, results mainly from the limited dimensions and power of the machine (e.g., industrial induction or synchronous motors).

Because of these substantial differences, especially as compared with that embodied in the combinations of the pending claims, Applicant respectfully submits that a person of ordinary skill in the art would not look to *Säpper* to solve a problem not identified by either *Säpper* or *GB '875*, and combine the features of the machines described therein as suggested in the Office Action. Furthermore, combining *Säpper* and *GB '875*, as suggested to be obvious in the Office Action, would result in an unworkable machine: a large turbine generator without an additional fan, which could not be properly cooled, either by external air or by Hydrogen, under the pressures commonly used in the industry. One of ordinary skill in the art would find that, with the dimensions of the hypothetical machine thus constructed in the Office Action, the length of the internal cooling ducts and the dissipated losses along these ducts increases, which inevitably

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leads to the use of an additional external fan, all the more since the gas exiting the rotor is generally already too hot to cool the stator efficiently.

Concerning Claim 5 and the opinion expressed in the Office Action that it would have been obvious for someone skilled in the art to provide a range of at least 10 bar of a superatmospheric pressure within the machine, Applicant respectfully disagrees. Hydrogen-cooled generators, as one of ordinary skill in the art would immediately understand, have not exceeded 5-6 bars above atmospheric pressure. Above this currently used range of pressure, those of skill in the art understand that it becomes very difficult to limit the gas leakage at the rotating seals, which becomes crucial when Helium is used, as in an exemplary embodiment of a machine in accordance with the present invention (Helium commonly being used to detect leakages).

A close review of *Davidson* reveals that, like *Säpper* and GB '875, that there are more differences between *Davidson* than indicated in the Office Action. According to the sole figure of *Davidson*, the coolant barely licks the stator winding overhangs on their internal face, instead of passing through them, and the coolant flowing past the winding overhangs does not then flow through cooling channels in the rotor but passes through ducts 33 in the stator. Indeed, *Davidson* provides shrouds 25 expressly to help define a gas flow passage 27 "extending from the outside of the stator core 15 to the fan inlet" (pg. 2, lines 20-24); *Davidson* uses fans 23 to circulate the coolant; and *Davidson*'s machine is not an entirely submerged generator.

Therefore, Applicant respectfully submits that one of ordinary skill in the art, upon a full and fair reading of *Davidson* and *Säpper*, would not be motivated to modify the machine described in *Davidson* with structures from *Säpper*'s machine to arrive at a construct similar to the claimed combinations, at least because *Davidson* goes to great length to direct gas flow away from the stator end winding to fans that blow the gas flow into the rotor and stator, and *Säpper* describes a machine coolant delivered from outside the machine. Accordingly, *Davidson* teaches directly away from some of the combination of the pending claims, and *Säpper* does not make up for these deficiencies.

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While Claims 6 and 7 depend from Claim 1, and are therefore allowable for at least the same reasons, *Jampen* also fails to remedy the deficiencies of *GB '875*, *Davidson*, and *Säpper* with respect to the subject matters of the pending claims. *Jampen* merely describes a way to feed a generator enclosure with Helium, and is silent as to the way to use Helium and circulate it inside a generator enclosure. *Jampen* does not instruct one of ordinary skill in the art how acceptable dielectric properties can be combined with excellent thermal properties in a cooling circuit if the running pressure is sufficiently high, and *Jampen* provides no motivation to one of skill in the art to use Helium.

Kudlacik appears to deal with the well-known GENERREX excitation system developed by GE. Although one part of this system (the compounding transformer) is cooled by the gas going to the generator, it is not a rotating system. Instead, steady external rectifier cubicles are used. Accordingly, *Kudlacik* cannot make up for the deficiencies of *GB '875*, *Davidson*, and *Säpper* with respect to the subject matters of the pending claims.

Crowdy describes a generator using two radial grease lubricated bearings (see col. 1, line 40), which bearing could not be applied to a large turbo generator exhibiting high peripheral speeds. *Crowdy* also fails to make up for the deficiencies of *GB '875*, *Davidson*, and *Säpper* with respect to the subject matters of the pending claims.

For at least the foregoing reasons, Applicant respectfully submits that the subject matters of Claims 1-9, 11, and 12, each taken as a whole, would not have been obvious to one of ordinary skill in the art at the time of Applicant's invention, are therefore not unpatentable under 35 U.S.C. § 103(a), and therefore respectfully requests withdrawal of the rejection thereof under 35 U.S.C. § 103(a).

Conclusion

Applicant respectfully submits that the present patent application is in condition for allowance. An early indication of the allowability of this patent application is therefore respectfully solicited.

If Mr. Mullins believes that a telephone conference with the undersigned would expedite

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passage of this patent application to issue, he is invited to call on the number below.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. If, however, additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and the Commissioner is hereby authorized to charge fees necessitated by this paper, and to credit all refunds and overpayments, to our Deposit Account 50-2821.

Respectfully submitted,

By: 

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